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AUTHOR Crocker, Betty; And Others
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ABSTRACT

Observation in schools by college supervisors indicates a gap between what a teacher knows on a theoretical level and what is actually done in classrooms on a practical level. This study was to determine where teachers perceived encountering encouragement or discouragement for lessons involving hands-on activities in science. A questionnaire was developed and administered to 135 teachers. The results indicate that a teacher's early experiences and feelings of personal success have a direct impact on the continued or discontinued use of hands-on science activities in their classroom. The source of the strongest encouragement to use hands-on experiences were identified as the areas of Teaching Experience and Self, yet, the source of the strongest discouragement were the areas of Teaching Experience and Administration. Many teachers indicated that they had received strong encouragement and had enough knowledge of the teaching style, but they were not teaching in a style compatible with their science methods class. If teachers had positive teaching experiences with these methods and felt confident about themselves, they were more likely to use hands-on experiences in their classrooms. (There are 7 tables and 15 references.) (YP)

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Betty Crocker
College of Education
University of North Texas
Denton, Texas 76203

Edward L. Shaw, Jr.
College of Education
Early Childhood and Elementary Education
The University of South Alabama
Mobile, Alabama 36688

Barbara Reed
Norcross High School
Gwinnett County Schools
Duluth, Georgia 30136

A paper presented at the annual meeting of the National Association for Research in Science Teaching, Atlanta, Georgia, April 8-11, 1990.

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Effects of Encouragement or Discouragement for Using Hands-on Science Activities upon Teaching Style

Introduction

Observations in schools by college supervisors indicate a gap between what a teacher knows on a theoretical level and what is actually done in classrooms on a practical level. While studying specific performance of student teachers in university settings and in classroom settings, Wolfe (1977) noted a weak relationship between performance in the two settings. For most teachers, the acquisition of a skill is not sufficient to produce a transfer of that skill into the classroom. Showers (1983, p.1) states "the conditions of the classroom are sufficiently different from the training situations that one cannot simply walk from the training setting into the classroom with the skill completely ready for use--it has to be changed to fit classroom conditions." How are teachers encouraged or discouraged from making this change so that transference can occur?

The teaching of science information was listed as the purpose of science classes in the elementary school by fifty-eight percent of the preservice teachers surveyed by Zeitler (1984). Although only ten percent thought the teaching of the process skills was the main purpose of science, the literature indicates there has been an emphasis upon teaching science processes to elementary teachers, through hands-on activities, for nearly two decades (Okey, 1972; Bluhm, 1979; Mechling, 1982). Apparently this emphasis has had little impact upon preservice teachers' perceptions of the purpose of science in the elementary school (Zeitler, 1984) and, therefore, how science is taught. At the Critical Issues Conference held November 22, 1986 in Oklahoma City, the status of elementary science teaching was discussed. The conclusions of the conference, which were in agreement with Pratt (1981), Bennett (1987), and Andrew (1980), was that science generally is not taught in elementary

schools, and when it is taught, the textbook is the program (Sprung, 1987).

During these days of reevaluation and teacher education reform, no teacher education program can ignore areas in which students fail to apply what they are supposed to have learned (Corcoran, 1981). It is frustrating to instruct students on the importance and correct uses of hands-on activities, especially in science, during methods classes and then observe something else in a field setting. Research information about "the processes of change during teacher preparation" called for by Fuller and Brown (1975, p.41) has been slow to develop although there is a growing collection of beginning teacher information.

Why are lessons and ideas not transferred from university methods classes into a field setting? Is this a result of pressures such as students feeling a lack of preparation, attitudes applied by fellow teachers, the need to finish the book, or adhere to the curriculum, or attitudes demonstrated by principals or other administrators? Whose encouragement or discouragement for using hands-on activities actually impacts a teacher's presentation style? Where does the greatest amount of encouragement or discouragement occur? Can preservice instruction in methodologies play a stronger role in the actual presentation styles observed in classrooms?

Purpose of the Study

The purpose of this study was to determine where teachers perceived encountering encouragement or discouragement for lessons involving hands-on activities in science; how strong this encouragement or discouragement was; and the effect this has had on their teaching styles.

Procedure

A six-part questionnaire was developed by the researchers to: 1.) collect demographic information; 2.) determine the possible sources of encouragement for

using hands-on activities in the elementary science classrooms; 3.) determine the perceived importance of encouragement as having an effect on their teaching style; 4.) the possible sources of discouragement for using hands-on activities in the elementary science classroom; 5.) the perceived importance of discouragement affecting their teaching styles; and, 6.) what percentages of time specific teaching styles were used and an additional question asked for preferred teaching styles. A six point Likert scale was used on parts 2-5. A copy of the questionnaire can be found in Appendix A. The questionnaire took approximately 20 minutes to complete.

The questionnaire was administered to 135 teachers currently teaching elementary or middle school in Alabama, Georgia, Texas, and Oregon. The teachers surveyed may be, but are not necessarily, teaching only science. The number of years of experience ranged from just completing student teaching to twenty-plus years. The average number of years of teaching experience was four. (See Table 1)

Insert Table 1 About Here

Results and Conclusions

The "typical" teacher in this survey has been teaching grades K-3 for four years in a self-contained elementary school classroom. She student taught in the same grade-level (K-4) and subject (all) range, and has either a B.S. or a B.A. Since she has had a science methods class since 1970, exposure to hands-on activities was probably part of the content emphasized in other methods classes.

The results of this questionnaire identified and ordered sources from which 135 surveyed teachers received either encouragement or discouragement for using hands-on science activities as a teaching style in their classrooms (See Tables 2, & 4).

Insert Tables 2 & 4 About Here

How important this encouragement or discouragement was to the participant is also shown (See Tables 3 & 5).

Insert Tables 3 & 5 About Here

Several participants took the time to write comments indicating that they never received any active discouragement . Although discouragement was reported, it was always in smaller amounts than encouragement. Teaching experience, self, and cooperating teachers were sources that ranked within the top four important sources for both encouragement and discouragement (See Tables 3 & 5). A source of discouragement repeatedly reported was the custodian. The custodian often complained about how messy classes were that used hands-on activities. This was an interesting point because this particular source did not appear on the original questionnaire.

The results indicate that a teacher's early experiences and his/her feelings of personal success have a direct impact on the continued or discontinued use of hands-on science activities in their classroom. The sources of the strongest encouragement to use hands-on experiences were Teaching Experience and Self. The sources of the strongest discouragement to use hands-on experiences were Teaching Experience and Administration. It would appear that if teachers had positive teaching experiences with these methods and feel confident about themselves, then they would use hands-on experiences in their classrooms. How can these positive experiences be better fostered through a methods class? Conversely, if these initial

experiences were negative or were negatively reinforced by the administration, teachers would not be willing to risk using these teaching techniques again, no matter what they were taught in a methods class. Can a greater emphasis be placed on combining actual field experience with direct support and supervision by a science educator as a standard part of a science methods class? What impact can science methods classes have on increasing demonstrated administrative support for utilizing this teaching style? Through field experiences as part of a methods class, both preservice and inservice teachers could gain valuable positive experiences in successfully teaching science through the use of hands-on activities and receiving active encouragement from administrators to continue to do so.

Another source that appears to have a great deal of impact on teachers was their cooperating teacher during student teaching. Spearson and Joyce (1973) observed behaviors of student teachers and cooperating teachers and concluded that the cooperating teacher substantially influences the behavior of the student teacher. Student teachers spend more clock hours with their cooperating teacher than with a science educator in a methods class. As a result, student teachers' philosophies and teaching styles are influenced more strongly by their cooperating teacher. In a paper presented at the 1977 AERA conference, Zerin concluded that student teachers tend to imitate their cooperating teachers in the field, regardless of the approval or disapproval of the college supervisor or methods instructor. Henry and Beasley (1982) state that the cooperating teacher has a greater impact on professional skills and potential than any other part of the professional preparation. It appears that although little active discouragement is perceived from such an important source during student teaching as the cooperating teacher, the lack of 'active' encouragement from this source is also an important factor in selecting a teaching style. Greater emphasis should be placed on the selection of cooperating teachers who are modeling the desired teaching styles.

Teachers indicated that they have received strong encouragement for the use of hands-on teaching of science, minimal amounts of discouragement for hands-on teaching of science, and that they have knowledge of a teaching style conducive to the successful use of hands-on teaching of science in their classroom. However, they

indicated they are not utilizing a teaching style that is compatible with the strong hands-on emphasis received in their science methods class. The small group activities method was reported as the preferred teaching style by 40% of the participants, but was reported as being used to teach science only 27% of the time (See Tables 6 & 7). Individual student experiments were selected as the preferred style by 17% of the participants and was reported as being used to teach science 21% of the time. Lecture was the preferred style for only 10% of the participants, but was reported as being used 21% of the time in the science classroom. Twenty seven percent of the participants chose not to select one particular teaching style as a preferred style.

Insert Tables 6 & 7 About Here

It appears, from the results of this survey, that there is not one particular source of active discouragement identified by these teachers. Two of the problem areas identified, teaching experience and self, are very difficult for science educators to address and therefore resolve. The results indicated that these two identified areas provide the greatest source of encouragement to use hands-on experiences in their classroom. Conducive teaching environments provided by school districts, administrators, and support staff may ultimately provide the greatest source of encouragement for teachers.

Areas of interest generated for future research studies include: the impact of cooperating teachers on the future teaching styles and philosophies of preservice teachers; the effects of a strong background in the pure sciences; training in science education on preferred teaching styles of teachers; and effective ways to cope with the decline in the use of hands-on activities.

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Table 1

Demographics

Number of Participants: 135

Females: 100
Males: 35

Mean Years Teaching Experience: 4
Medium Years Teaching Experience: 7

Highest Degree: B.S. & B.A. (52.6%) M.Ed. (37.7%)

Mean grades for student teaching: K-4 (self-contained)

Percentage that have had a science methods class since 1970: 52%

Currently, grades K-3, in a self- contained classroom, are the most commonly taught grades.

In a departmentalized school, science was the most commonly taught subject.

Table 2

Sources of Encouragement to use Hands-on Activities in their Classroom*

Self	**51%**
Teaching Experience	**39%**
Students	**30%**
College Supervisor	**30%**
Science Methods Courses	**28%**
Administration	**28%**
Other Methods Courses	**26%**
Cooperating Teacher	**21%**
Parents	**12%**
Others	**7%**

***Percentages indicate the rank as determined by responses to each item. Responses ranged from non- applicable (1) to required (6).**

Table 3

Perceived Importance of Encouragement on Teaching Style*

	Rank
Teaching Experience	1
Self	2
Students	3
Cooperating Teacher	4
Science Methods Courses	5
College Supervisor	6
Other Methods Courses	7
Administration	8
Parents	9
Others	10

*Ranked as reported

Table 4

Source and Amount of Discouragement to use Hands-on Activities in their Classroom*

Teaching Experience	16%
Administration	10%
Cooperating Teacher	10%
Self	10%
Other Methods Courses	7%
Science Methods Courses	6%
College Supervisor	6%
Parents	4%
Others	2%

*Percentages indicate the rank as determined by responses to each item. Responses ranged from non-applicable (1) to required (6).

Table 5

Perceived Importance of Discouragement on Teaching Style*

	Rank
Teaching Experience	1
Administration	2
Self	3
Cooperating Teacher	4
Other Methods Courses	5
Science Methods Courses	6
College Supervisor	7
Students	8
Parents	9
Other	10

*Ranked as reported.

Table 6

Preferred Teaching Style

	N	% of N
Small Group	41	40
Did Not Select	36	27
Individual Experiments	23	17
Lecture	13	10
Teacher Demonstration	5	4
Seatwork	1	1
Student Demonstration	1	1

Table 7

Percentage of Time Teaching Style Utilized

	%
Small Group	27
Individual Experiments	21
Lecture	21
Teacher Demonstration	16
Seatwork	14
Student Demonstration	10
Others	1
Total	110*

*110% due to reported combinations of the various teaching styles